Conservation Assessment

for

Prairie Warbler (Dendroica discolor)

Photo: E. J. Fisk

USDA Forest Service Eastern Region
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This document is undergoing peer review, comments welcome

This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

This is a draft Conservation Assessment providing a summary of readily available information on the distribution, ecology, habitat, and population biology of the prairie warbler (*Dendroica discolor*) in the Great Lakes Region.

This species is a neo-tropical migrant whose population appears to be stable globally, though the breeding populations in the Midwest are on an apparent decline. The North American Breeding Bird Survey (BBS) found, that between 1966 and 1993, there was a significant population decline of 44%, with the Midwest states (Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) decreasing 1.4% each year. During this time, it was noted that 62% (47 of 76) of the routes used by the BBS were experiencing negative trends (NatureServe 2001).

The greatest threat to the prairie warbler results from habitat loss. This species depends upon early-succession shrub habitat, a habitat that is declining in abundance due to forest succession, fire suppression, and other changing land use patterns. Critical shrubby dunelands are also being lost to development, as is habitat within the prairie warbler's winter range in the Caribbean. Nest parasitism by the brown-headed cowbird and nest predation by snakes, chipmunks, and jays are also major threats to the prairie warbler as they decrease nest success.

There are several research needs for the prairie warbler: 1) determine the length of time the early-successional stage of habitat is suitable; 2) determine response to different burning or cutting regimes; 3) determine other habitat requirements; 4) determine proportion of males breeding in a population (for accurate breeding abundance estimates); and 5) further study on winter range habitat requirements and population trends.

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NOMENCLATURE AND TAXONOMY

Scientific name: *Dendroica discolor* (Vieillot, 1809)

Subspecies: *D.d. discolor* (nominate race), *D.d. paludicola* - This subspecies is larger and its plumage is much paler overall with a grayish back, males lack the wide black markings on sides (TNC 2001). The breeding range in the continental U.S. is restricted to Florida (NatureServe 2001).

Common name: Prairie Warbler

Order: Passeriformes

Family: Parulidae

DESCRIPTION OF SPECIES

The prairie warbler is a medium-sized, warbler measuring 11.5-12.5 cm in total length (NatureServe 2001) with a mass of 6.4-8.8 g (Nolan et al.1999). Breeding males have the brightest coloration with an olive-green dorsal area with chestnut streaks on the upper back and yellow ventral plumage with dark streaks on the flanks. A thick black eyeline, malar line, pale wing bars, yellow rump, dark legs, and white spots on the outer tail feathers are also characteristic of the male. With minor sexual dimorphism, the female is paler, lacks the chestnut streaks, and her markings are gray-olive, not black. Juveniles are patterned similar to the female. The prairie warbler is the only warbler that is bright yellow on its face and ventral surface, and the only one with the malar stripe separating the yellow facial feathers from the throat feathers. In addition, this species displays a characteristic tail-bobbing behavior (NatureServe 2001).

This is a diurnal or crepuscular species in which the males are most easily detected during the first 60-90 minutes of daylight or in the evening before dusk (NatureServe 2001). The females of this species rarely use the song vocalization, most singing is done by the males (Nolan et al. 1999). The song consists of a series of ten or more short, evenly spaced notes ascending in scale and lasting approximately 2 seconds (NatureServe 2001). The males of this species have two songs; type-A versions are used for communication with the female and during pair formation, while type-B songs tend to be used with more general application. Unpaired males tend to sing type-A songs at sunrise and sing a lot throughout the day while paired males sing more type-B songs and sing less often (TNC 2001). There are numerous calls used by these birds, with males using ≥10 and the female using ≥8 (Nolan et al. 1999).

LIFE HISTORY

The prairie warbler is an invertivore, feeding primarily on insects and sometimes spiders, snails, or worms. Nestlings are primarily fed caterpillars (Cooper 2000). This species forages by gleaning insects from leaves and branches, and will occasionally take prey mid-air (DeGraaf 1991). If particular insects are apparently abundant on certain plant species, the prairie warbler appears to seek out those plants. Foraging typically occurs a few meters off the ground, though

males will forage from higher perches during the breeding season when he is advertising (Nolan et al. 1999).

The prairie warbler is a neo-tropical migrant that heads to its wintering range around September and returns to its breeding range in the spring. This species migrates nocturnally and at earlier dates than most other warblers (Nolan et al. 1999). Populations in the northern part of the range leave later in the fall and arrive later in the spring than those in the southern ranges (NatureServe 2001). Spring migration begins in March with most prairie warblers gone from the winter range by the end of April. Arrival varies across its range, occurring in the second half of April in Indiana, 10-15 May in Ohio, the first half of May in Michigan, and the second week of May in Ontario (Nolan et al. 1999).

Males establish territories ranging from 0.24 ha to 3.5 ha (Nolan et al. 1999), and typically return to the same territory used in previous years (Species at Risk 2001). This species is monogamous and will typically find a new mate each year. The female may leave after a nesting attempt with one male and attempt to mate with another male. Some males may also mate with multiple females in non-adjacent territories (TNC 2001). Pairing typically occurs approximately one week after the male returns to his territory with breeding occurring in late May to mid July in Michigan (Cooper 2000). The average density of the prairie warbler range-wide is typically less than 1 pair per ha (NatureServe 2001).

The nest is an open-cup of compactly woven plant fibers and assorted vegetative materials and is lined with hair and/or feathers (MNFI 2000). Typically placed in a shrub, sapling, thicket, or fern clump, the nest is usually 1-10 feet off the ground. Clutch sizes range from 3-5 with an average of 4 eggs that are white to off-white and usually wreathed with brown marks. Incubation is primarily carried out by the female and lasts approximately 11 to 15 days. The young are dependent on adults upon hatching, are attended to by both parents, and typically fledge in 8-10 days. After fledging, the young will remain dependant upon the parents for an additional 30-35 days (MNFI 2000). One brood per year is typical, though two per year has been observed.

HABITAT

The prairie warbler is an upland shrub warbler that typically inhabits open brushy areas with poor, dry, sandy soil. The Atlas of Breeding Birds of Michigan (Brewer et al. 1991) identifies three habitats that are used in Michigan: 1) early successional stages of Great Lakes dunelands where deciduous or coniferous bushes are intermixed with dune grass and other herbs (e.g. Sleeping Bear Dunes National Lakeshore); 2) Jack pine plains burnt 10-20 years previously (e.g. Kirtland's warbler management areas); and 3) recently burnt areas of the pinery now dominated by deciduous shrubs and small trees. This species will inhabit disturbed areas such as powerline right-of-ways, Christmas tree plantations, abandoned fields and orchards, or forest openings surrounded by shrubs (Cooper 2000). Disturbed areas are deemed suitable 5 years after the burning or clearing and will remain suitable for approximately 10-20 years (NatureServe 2001). The vital part of the prairie warbler's habitat is the presence of open spaces, low trees and shrubs, and the absence of high canopy. In Michigan, the Lake Michigan sand dunes have been termed the critical breeding areas for the prairie warbler (Brewer 1991). According to the Michigan Natural Features Inventory (2000), this species will typically exploit one area for a number of years then, move on due to the natural succession of the area.

DISTRIBUTION AND ABUNDANCE (RANGEWIDE/REGIONWIDE)

The prairie warbler's breeding range encompasses most of the eastern United States (U.S.), from eastern Texas north through southern Missouri, northeast through southern New England and south to northern Florida. There are also isolated populations north into Michigan and southern Ontario. The non-breeding range is almost exclusively within the Caribbean islands, with a few birds remaining in the extreme southeastern United States (NatureServe 2001).

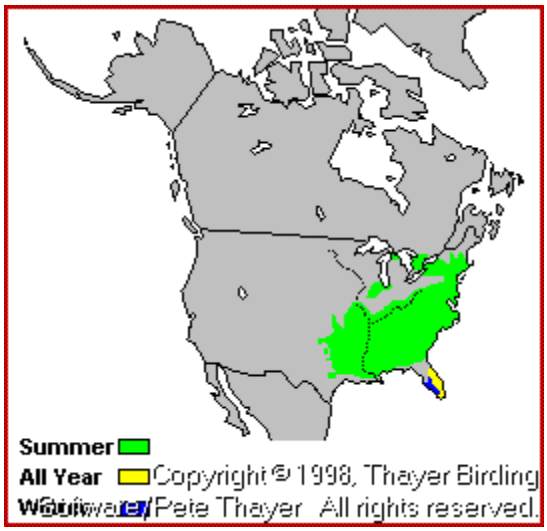

Figure 1. Range Map of the Prairie Warbler

STATUS

Table 1. State or Provincial and Heritage Status Rankings for the Prairie Warbler

State or Province	State or Provincial Ranking	Heritage Status Ranking*
Illinois	Not Listed	S4
Indiana	Not Listed	S4B
Michigan	Endangered	S1
Minnesota	Not Listed	Not present
New York	Not Listed	S5
Ohio	Not Listed	S5
Ontario	Not Listed	S3S4B, SZN
Pennsylvania	Not Listed	S4B
Wisconsin	Not Listed	SZN

*Heritage Status Rankings: S: Subnational N: National
1: Critically imperiled 2: Imperiled 3: Vulnerable to extirpation or extinction
4: apparently secure Z: Zero occurrences B: Breeding range
N: Non-breeding range ?: unranked

Other Statuses:
National Heritage Status Rank: United States: N5B, N?N
Canada: N3N4B
Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Not at risk.

This species is noted as being stable globally, though it appears that the number of breeding birds is declining, particularly in the Midwest (NatureServe 2001). The Michigan Natural Features Inventory (2001) classifies the Midwest populations as moderate to high management concern. The National Audubon Society Watchlist (2001) lists this species as uncommon to fairly common with an intermediate breeding distribution (26-50% of temperate North America) and a largely decreasing population trend (≥ 5% annual decrease). The BBS found that between 1966 and 1993, there was a significant population decline of 44%, with the Midwest states (Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) decreasing 1.4% each year. During this time span, it was noted that 62% (47 of 76) of the routes used by the BBS were experiencing negative trends (NatureServe 2001).

The southeastern and south-central portions of the U.S. did experience declines between 1966 and 1987, but these declines were only detected in the uplands, not in the lowlands (NatureServe 2001). In Canada, it appears that the populations are stable, though distribution is patchy (NatureServe 2001). In Ontario, there are approximately 500 breeding pairs, generally found along Georgian Bay and in Frontenac County (ROM 1999).

Historically in Michigan, this species probably inhabited the jack pine plains and dunelands. In the 20th century, intensive logging practices and fires increased the prairie warbler habitat, which led to an increase in the population. The 1950s-1960s saw what was most likely the peak of the population numbers with the population declining ever since. As of 1991, this species was still found on the dunelands and sandy abandoned agricultural land, though it was not found as abundantly on the jack pine plains as it once was (Brewer et al. 1991). Currently, the populations of prairie warbler in Michigan are small and scattered, though much suitable habitat appears to be available. This observation has led some researchers to believe that the prairie warbler's habitat requirements may be much more confined than originally thought (Cooper 2001).

In Ohio, the prairie warbler is common throughout the southeastern region of the state, being far too numerous for accurate population estimates. In the southwestern region, it is locally abundant, and rare or sparingly distributed in much of northern and western Ohio (Jim McCormac Pers. comm. 2001).

POPULATION BIOLOGY AND VIABILITY

Prairie warblers begin breeding within their first year and will breed annually for the duration of their lives. The female will lay a clutch of 3-5 eggs and though one brood per year is typical, she may lay a second clutch. A typical monogamous female will have 37.4% of her eggs hatch and 20% of her young fledge. Post-fledgling mortality in this species is very high. Mortality from post-fledge to independence is 18%, from independence to first breeding season is 61%, and is 35% each year thereafter. Prairie warblers have an average lifespan of 3.5 years and a potential maximum lifespan of 10.5 years. The calculated lifetime production of the average prairie warbler is 5.4 independent young per female (Nolan et al. 1999).

POTENTIAL THREATS AND MONITORING

Present or Threatened Risks to Habitat or Range

One of the greatest threats to the prairie warbler is habitat loss. As time progresses, a decrease is being seen in the early-successional habitat that is necessary for prairie warbler populations (NatureServe 2001). Such practices as reforestation and fire suppression have sped succession beyond its natural rate, while mowing and broadcast spraying of herbicides have maintained some habitat at too early of a successional stage for this species (NatureServe 2001). Habitat is also being lost to development, such as is being seen along the Great Lakes shorelines (Audubon 2001).

Prairie warblers are very concentrated in their winter range, which makes them particularly vulnerable to threats presented within that range. Habitat loss to agriculture, woodcutting, and development are being seen in the winter range, which could be accounting for the population declines presently being observed in the breeding range. In addition, mortality due to hurricanes and hunting by children with slingshots in the winter range may also account for population declines (NatureServe 2001).

Table 2. Threats or Risks to the Prairie Warbler and its Habitat by Forest

Forest	Threat or Risk
Chequamegon-Nicolet	Not on RF Sensitive Species list for the Chequamegon-Nicolet NF.
Chippewa	Not on RF Sensitive Species list for the Chippewa NF.
Hiawatha	No threats identified; Hiawatha NF is on the northern edge of its range, therefore expected to be rare.
Huron-Manistee	No threats identified, there appears to be adequate habitat available.
Ottawa	Not on RF Sensitive Species list for the Ottawa NF.
Superior	Not on RF Sensitive Species list for the Superior NF.

Commercial, Recreational, Scientific, or Educational Over-utilization

N/A.

Disease or Predation

Next to habitat loss, nest parasitism and predation are two of the greatest threats to the prairie warbler. The brown-headed cowbird (*Molothrus ater*) acts as a nest parasite to this species and may even cause the female to abandon the nest completely (Audubon 2001). In the northern reaches this is a particular problem as there typically is not enough time within one season to re-brood after abandoning a nest. Nest predation by such predators as snakes, chipmunks (*Tamias spp*.) and *Corvids* greatly reduce nesting success. One study observed as high as 80% of the failed nesting attempts attributed to predation (Cooper 2001).

According to NatureServe (2001), the only known disease of adults is avian pox, but lesions occur on less than 1% of sampled birds. Mites, ticks, lice, nematodes, and blowfly larvae on nestlings are the only known parasites (Nolan et al. 1999).

Inadequacy of Existing Regulatory Mechanisms

N/A.

Other Natural or Human Factors Affecting continued Existence of Species

Though only a minor threat, this species has been known to lose nests to wind, rain, and faulty construction (Nolan et al. 1999).

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Table 3. Number of Occurrences of the Prairie Warbler and Land Ownership by National Forest

Forest	Number of Occurrences	County	Land Ownership	Comments
Chequamegon-Nicolet	Not a RFSS on this Forest.			Refer to the county occurrence listing in Table 4.
Chippewa	Not a RFSS on this Forest.			Refer to the county occurrence listing in Table 4.
Hiawatha	1 occurrence	Schoolcraft	FS	1995 in Kirtland's Warbler habitat (Steve Sjogren pers. comm. 2001)
Huron-Manistee	There are reports, though no confirmed nesting		FS	
Ottawa	Not a RFSS on this Forest.			Refer to the county occurrence listing in Table 4.
Superior	Not a RFSS on this Forest.			Refer to the county occurrence listing in Table 4.

Table 4. Prairie Warbler Occurrences in the Great Lake States by County, State, and Year

State	County of Occurrence	Number of Occurrences and Year
Illinois		
Indiana		The Prairie Warbler is a fairly common species in this state, and as a result, is not tracked
Michigan*	Alcona	1 occurrence: 1998
	Allegan	2 occurrences: 1993, 1994
	Benzie	1 occurrence: 1993
	Berrien	2 occurrences: 1997(2)
	Cheboygan	1 occurrence: 1986
	Delta	1 occurrence: 2000
	Iosco	1 occurrence: 1996
	Leelanau	2 occurrences: 1993(2)
	Mason	1 occurrence: 1995
	Muskegon	1 occurrence: 1997
	Oscoda	4 occurrences: 1996(4)
	Presque Isle	1 occurrence: 1998
	Schoolcraft	1 occurrence: 1995
	St Joseph	1 occurrence: 1997
	Van Buren	1 occurrence: 1997
Minnesota**		Only a casually occurring species in this state, therefore not tracked.
New York*	Albany	10 occurrences: 1980(1), 1981(2), 1982(2), 1983(2), 1984(2), 1985(1)
	Allegany	7 occurrences: 1980, 1981, 1982, 1983, 1984, 1985 (2)
	Broome	7 occurrences: 1980, 1981, 1982, 1983(2), 1984, 1985
	Cattaraugus	1 occurrence: 1985
	Cayuga	2 occurrences: 1982, 1983
	Chautauqua	1 occurrence: 1985
	Chemung	8 occurrences: 1980, 1981, 1982(2), 1983(2), 1984(2)
	Chanango	4 occurrences: 1981, 1983, 1984, 1985
	Columbia	10 occurrences: 1980, 1981(2), 1982, 1983(2), 1984(2), 1985(2)
	Cortland	1 occurrence: 1983
	Delaware	7 occurrences: 1980, 1981(2), 1982, 1983, 1984, 1985
	Dutchess	11 occurrences: 1980(2), 1981(2), 1982(2), 1983(2), 1984(2), 1985
		1 occurrence: 1983
		1 occurrence: 1983
		1 occurrence: 1983
		10 occurrences: 1980, 1981, 1982(2),

State	County of Occurrence	Number of Occurrences and Year
		1983(2), 1984(2), 1985(2)
	Essex	1 occurrence: 1984
	Fulton	3 occurrences: 1983(2), 1985
	Genesee	2 occurrences: 1983, 1984
	Greene	3 occurrences: 1983, 1984, 1985
		4 occurrences: 1981,1982, 1983, 1985
		2 occurrences: 1982, 1985
	Jefferson	11 occurrences: 1980, 1981(2), 1982(2),
	Livingston	1983(2), 1984(2), 1985(2)
		1 occurrence: 1983
	Madison	4 occurrences: 1982, 1983, 1984, 1985
	Montgomery	8 occurrences: 1980, 1981, 1982(2),
		1983(2), 1984(2)
	Nassau	5 occurrences: 1980, 1981, 1983, 1984,
		1985
	Ontario	1 occurrence: 1980
	Orange	7 occurrences: 1980, 1981, 1982,
		1983(2), 1984, 1985
		4 occurrences: 1983, 1984(2), 1985
	Orleans	7 occurrences: 1982(2), 1983, 1984(2),
	Otsego	1985(2)
		8 occurrences: 1980, 1981(2), 1983(2),
	Putnam	1984, 1985(2)
		5 occurrences: 1980(2), 1984(2), 1985
	Rensselaer	1 occurrence: 1984
		6 occurrences: 1982, 1983, 1984(2),
	Richmond	1985(2)
	Rockland	12 occurrences: 1980(2), 1981(2),
		1982(2), 1983(2), 1984(2), 1985(2)
	Saratoga	5 occurrences: 1982(2), 1983(2), 1984
		6 occurrences: 1980, 1981, 1983(2),
	Schenectady	1984, 1985
		5 occurrences: 1980(2), 1981, 1982,
	Schoharie	1983
		7 occurrences: 1981, 1982(2), 1983,
		1984(2), 1985
	Schuyler	1 occurrence: 1983
		2 occurrences: 1984, 1985
	Seneca	10 occurrences: 1980(2), 1981(2),
	Steuben	1982(2), 1983(2), 1984(2)
		2 occurrences: 1983(2)
	Suffolk	1 occurrence: 1984
	Sullivan	
	Tioga	

State	County of Occurrence	Number of Occurrences and Year
	Tompkins Ulster Warren Washington Westchester Wyoming Yates	
Ontario		
Pennsylvania		
Wisconsin*	Grant Iowa Jackson Lafayette Marathon Milwaukee Ozaukee Portage	

* Information provided by: Indiana Natural Heritage Data Center, 2001; MNFI Natural Heritage Biological and Conservation Datasystem, 2001; New York Natural Heritage Program, 2001; Wisconsin Bureau of Endangered Resources, Department of Natural Resources, 2001 (Wisconsin probably County occurrence taken from Wisconsin Breeding Bird Atlas)

** Information provided by: Minnesota Natural Heritage and Nongame Research Program, 2001, and Steve Stucker (pers. comm. 2001).

SUMMARY OF EXISTING MANAGEMENT ACTIVITIES

At this time, there appears to be no specific management activities for the prairie warbler (NatureServe 2001). According to NatureServe (2001), this species has been classified as low risk of extinction due to its wide distribution, apparent broad habitat requirements, and the presence of some large populations. NatureServe also indicates the restoration potential for the prairie warbler as moderate since it is suspected that large-scale forest clearance is necessary to return populations to their 1960s levels.

Though no management programs are aimed specifically at this species, there are numerous suggestions on how to go about carrying out such activities. The top priority in management is to make suitable habitat available to the prairie warbler. According to Michigan Natural Features Inventory (MNFI) (2001), beneficial practices include prescribed burning, allowing natural succession in fields, creating large cut-over areas, maintenance of large thickets in agricultural areas, and the establishment of young pine forests. To introduce new habitat to the

environment, prescribed burning and clearcutting are the best options. However, it is important that if a large area is going to be cut or burned, that it is done in patches over time to provide a patch mosaic of different successional stages (NatureServe 2001). The length of time that these habitats are suitable can be increased with selective basal herbiciding of trees (NatureServe 2001). In addition to introducing new habitat, preservation of current habitat is a management necessity. There are some areas that have been able to maintain prairie warbler populations over a great length of time, perhaps thousands of years. Included in these sites are the shrubby sand dune habitats of the Great Lakes and Atlantic coast, the grassland-forest ecotone, and the closed-canopy forest of the Great Dismal Swamp (NatureServe 2001). The best plan for these areas is that of preservation followed by intensive monitoring after populations are identified. If the populations in these areas are found to be decreasing at the same rates as populations in changing environments, then researchers know to focus attention on the wintering ranges in an attempt to find the cause of population declines.

Past and Current Conservation Activities

The prairie warbler and its nesting site are protected under the federal Migratory Birds Convention Act of 1917. This protection applies to the United States; there is no protection in its wintering range.

RESEARCH AND MONITORING

Existing Surveys, Monitoring, and Research

The abundance of the prairie warbler within its breeding range is being measured by the BBS, while Christmas Bird Count (CBC) is monitoring some of the winter range populations. In addition, Breeding Biology Research and Monitoring Database (BBIRD) are looking at nesting success and habitat. In Arkansas, independent research is looking at the effects of burning and mowing on the breeding range (NatureServe 2001).

Survey Protocol

Standard Breeding Bird Survey protocols are used with the prairie warbler.

Research Priorities

Further study needs to be carried out to determine the length of time that habitat is suitable and what the prairie warbler's response is to different types of burning or cutting in different types of forests in different regions (NatureServe 2001). Likewise, further study is needed in the area of habitat requirements, such as how large and what size a patch needs to be, and what shape or vegetative structure is optimal (Cooper 2001). In the breeding range, proportions of breeding males need to be noted in order to determine actual estimates of breeding abundance, as it is speculated that current estimates may be inflated (NatureServe 2001). Many questions also remain about the wintering range of this species, such as whether the prairie warbler prefers a particular successional stage (NatureServe 2001). In Michigan, studies need to be conducted to determine the actual distribution, relative abundance, and rarity of this species (Cooper 2001). Monitoring data of prairie warbler populations in stable and changing environments needs to be

compared to determine if the succession of the habitat is the cause of the declines observed, or if there are other factors (NatureServe 2001).

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Review Requests